502 determines that a digitally encoded word was received, the SyncLost signal is reset at step **506** (along with any optional timeout counters).

Upon receipt of a digitally encoded SAS word, step **508** retrieves the digitally encoded idle word from a memory associated with the enhanced SAS device for purposes of comparing the digitally encoded idle word with a received digitally encoded signal. As noted above, the memory storing the idle word may preferably store the idle word in either of two possible disparity states (i.e., even disparity and odd disparity). Step **508** retrieves the idle word having the expected disparity from the associated memory. Step **510** then compares the retrieved digitally encoded idle word to the received digitally encoded signal. If the received digitally encoded signal is a digitally encoded idle word processing continues at step **512** sets the RXIdle signal applied to the PHY logic to indicate the start or continuance of an idle condition signaled by receipt of one or more digitally encoded idle words. Processing then continues looping back to step **500** to await receipt of a next digitally encoded word on the SAS communication medium.

If the received word is not a digitally encoded idle word, step **514** retrieves the digitally encoded burst word from the associated memory having the appropriate disparity expected for the next received digitally encoded signal. Step **516** then determines whether the next received digitally encoded signal is a digitally encoded burst word. If not, the digitally encoded word is processed by other logic as some other received word to be processed in accordance with standard SAS PHY logic. Processing then continues looping back to step **500** to await receipt of a next digitally encoded word on the SAS communication medium. If step **516** determines that the digitally encoded burst word was received, step **518** clears the RXIdle signal applied to the PHY logic to indicate that the idle condition has ended and that a burst condition has been encountered. The duration of the burst condition will be determined by the number of burst words received until a next idle condition is detected.

As noted above, the particular SAS OOB signal digitally encoded is determined in accordance with SAS standards by the duration and number of the idle and burst periods. The duration of each idle and burst period in accordance with the digital SAS OOB encoding/decoding features and aspects hereof is then determined by the number of idle/burst words transmitted from the other SAS device and hence the duration of the RXIdle signal applied tot eh PHY logic.

FIG. **6** is a flowchart describing another exemplary method in accordance with features and aspects hereof wherein an enhanced SAS device encodes a generated SAS OOB signal into corresponding digitally encoded information for transmission over a SAS communication medium (e.g., over an optical communication medium). The method of FIG. **6** may be performed within enhanced SAS devices such as described above with respect to FIGS. **1** and **2**.

The method of FIG. **6** represents processing by enhanced circuits coupled with the PHY logic of the SAS device. The enhanced circuits and hence the method of FIG. **6** are engaged when the PHY logic indicates and need to send a SAS OOB signal to the other SAS device and the digital OOB mode has been enabled by configuration of the transmitting SAS device. Step **600** therefore awaits enablement of transmission of a digitally encoded SAS OOB signal as indicated by the PHY logic (in conjunction with the enhanced features and aspects hereof). Step **602** then tests the TXIdle signal asserted/de-asserted by the PHY logic. The TXIdle signal, as discussed above, indicates that the PHY logic has determined that an idle condition is to be signaled to the other SAS device. Otherwise, a burst condition is to be signaled. If step **602** determines that an idle condition is to be signaled, step **604** retrieves the digitally encoded idle word (have appropriate disparity encoding) from the memory associated with the enhanced SAS device. Otherwise, step **606** retrieves the digitally encoded burst word. In both cases, the retrieved, digitally encoded SAS OOB word is then applied to the transmit data signal path to the SerDes for transmission of the retrieved digitally encoded word to the other SAS device. Processing then continues looping back to step **600** until the PHY logic indicates that the SAS OOB transmission is completed.

Additional and equivalent steps have been omitted from the flowcharts of FIGS. **5** and **6** for brevity and simplicity of this discussion. Such additional and equivalent steps will be readily apparent to those of ordinary skill in the art. Further, those of ordinary skill in the art will readily recognize that the methods of FIGS. **3** through **6** may be implemented as suitably programmed instructions in a general or special purpose processor within the enhanced SAS device, may be implemented as custom designed logic circuits within the enhanced SAS device, or may be implemented as a combination of custom logic circuits and suitably programmed instructions operable on a general or special purpose processor. Such design choices will be readily apparent to those of ordinary skill in the art.

While the invention has been illustrated and described in the drawings and foregoing description, such illustration and description is to be considered as exemplary and not restrictive in character. One embodiment of the invention and minor variants thereof have been shown and described. In particular, features shown and described as exemplary software or firmware embodiments may be equivalently implemented as customized logic circuits and vice versa. Protection is desired for all changes and modifications that come within the spirit of the invention. Those skilled in the art will appreciate variations of the above-described embodiments that fall within the scope of the invention. As a result, the invention is not limited to the specific examples and illustrations discussed above, but only by the following claims and their equivalents.

What is claimed is:

1. Apparatus integral with a PHY of a serial attached SCSI (SAS) device for coupling with another SAS device using an optical physical communication medium or using an electrical physical communication medium, the apparatus comprising:

PHY control circuits coupled with a physical communication interface and adapted to control data exchanges on the physical communication medium;

digital out of band (OOB) decoder logic coupled with the PHY control circuits, the digital OOB decoder logic adapted to detect receipt of a digitally encoded signal corresponding to a SAS OOB signal, the digitally encoded signal received from said another SAS device through the PHY control logic; and

digital OOB encoder logic coupled with the PHY control circuits, the digital OOB encoder logic adapted to generate a digitally encoded signal corresponding to a SAS OOB signal, the digital OOB encoder further adapted to apply the digitally encoded signal to the PHY control circuits for transmission to said another SAS device,

wherein the apparatus is operable to send and receive the digitally encoded signal without turning off a laser component of the apparatus where an optical physical communication medium is utilized,

wherein the PHY control circuits are adapted to selectively utilize SAS OOB analog signaling or digitally encoded signals for communicating the SAS OOB signal to said